Express Mailing Label No. EL 813 876 739 US

PATENT APPLICATION
Docket No. 14684.58

UNITED STATES PATENT APPLICATION

of

NEVILLE WAISBROD

KENT WALLACE PARKER

LYALL DOUGLAS STEWART

and

PETER ALAN TIERNEY

for

STORAGE STRUCTURE AND DOOR STRUCTURE

WORKMAN, NYDEGGER & SEELEY
A PROFESSIONAL CORPORATION
ATTORNEYS AT LAW
1000 EAGLE GATE TOWER
60 EAST SOUTH TEMPLE
SALT LAKE CITY, UTAH 84111

STORAGE STRUCTURE AND DOOR STRUCTURE

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] The present application claims priority to New Zealand Application No. 509,371, filed January 15, 2001, which is hereby incorporated by reference.

BACKGROUND OF THE INVENTION

1. The Field of the Invention

[0002] The present specification relates to a storage structure which has pocketing doors. In particular, although not exclusively, the invention relates to a storage structure having a curved shape with the doors also being conformable to the curved shape. The specification also relates to a door structure whereby the door panel is conformable to a curved configuration. The present specification describes the invention in terms of a small mobile cabinet for office equipment but the invention will have application to other types of furniture including in-built furniture and domestic furniture. Additionally, some aspects of the invention may also have application to doors for buildings.

2. The Relevant Technology

[0003] With the re-emergence of curved profiles in furniture forms in the latter part of the twentieth century, the difficulty arises in regard to doors for such curved furniture forms. Curved doors have in the past been made by steaming timber into the required shape. However, this is time-consuming and the technique is limited to doors

constructed of timber. Furthermore, curved doors are typically difficult to move into a stowage position when a compact furniture unit is required.

[0004] Accordingly, it is an object of the present invention to provide a storage structure or a door structure which addresses at least some of the foregoing disadvantages and/or provides the public with a useful choice.

WORKMAN, NYDEGGER & SEELEY
A PROFESSIONAL CORPORATION
ATTORNEYS AT LAW
1000 EAGLE GATE TOWER
60 EAST SOUTH TEMPLE
SALT LAKE CITY, UTAH 84111

SUMMARY OF THE INVENTION

[0005] In accordance with a first aspect of the present invention there is provided a storage structure including: a framework defining an interior including a storage space and an opening to the storage space wherein the framework includes a curved contour; and a closure comprising: an auxiliary portion which is slidably mounted substantially within the interior of the framework; and a door panel hingedly connected to the auxiliary portion by means of a hinge portion whereby the door panel is pivotable about the hinge portion from a closed position in which the door panel at least partially covers the opening to an open position, and movable from the open position to a pocketed position in which the door panel is at least partially received within the interior of the framework, wherein the door panel is resiliently deformable to adopt a curved configuration conforming to the curved contour of the framework.

[0006] In a particularly preferred form of the invention, the door panel and the auxiliary panel may be integrally formed. In particular, the door panel and the auxiliary panel may comprise a unitary plastic sheet. Suitably, the divide between the door panel and the auxiliary panel in the unitary plastic sheet is defined by the hinge portion. Most preferably the hinge portion is a live hinge comprising a region of reduced thickness in the plastic sheet.

[0007] However, the auxiliary portion is not limited to being in the form of a panel and may simply comprise lugs or sliders which are connected to the door panel and are slidably mounted within the interior of the framework.

[0008] The interior storage structure may be further provided with a cavity open at the front within which the auxiliary portion is slidably mounted and into which the door panel is movable when in the pocketed position. The cavity may be defined by two

internal walls, the inner one relative to the opening defining a hinging edge. The door panel and the auxiliary portion may be extendible from the cavity until the hinge is aligned with the hinging edge. Most preferably, a stop is provided to limit the outward travel of the door panel and the auxiliary portion from the cavity.

[0009] Preferably one or more guides are provided to facilitate the sliding travel of the auxiliary portion and/or the door panel. However in a most preferred form of the invention only the auxiliary portion is slidably mounted to the one or more guides with the door panel being free of the one or more guides.

[0010] In a most preferred form of the invention, the cavity to receive the door panel in the pocketed position is rectilinear and the flexible door panel can be straightened to be received with the cavity. The door panel may be of any construction enabling it to adopt a curved configuration or a configuration approximating a curved configuration. For example, the door panel may be constructed of interconnected sections in a manner similar to a tambour door. However, in a most preferred form of the invention the door panel is in the form of a resiliently deformable plastic sheet. As mentioned above, the door panel may also be integral with the auxiliary panel within a unitary plastic sheet.

[0011] A retainer may also be provided to retain the door in the closed position especially in view of the embodiment of a flexible door panel. Accordingly, one or more first engagement portions may be provided on the outer edge of the door panel with one or more cooperable second engagement portions provided on a corresponding part of the door structure. The first and second engagement means may be continuous along the outer edge and on the corresponding part of the door frame. For example,

WORKMAN, NYDEGGER & SEELEY
A PROFESSIONAL CORPORATION
ATTORNEYS AT LAW
1000 EAGLE GATE TOWER
60 EAST SOUTH TEMPLE
SALT LAKE CITY, UTAH 84111

hook and loop fastener may be used as the retainer (VELCRO(TM)). Alternatively, magnetic strips or tabs may be used.

[0012] In accordance with a second aspect of the present invention there is provided a door structure including: a door frame having edge portions of which at least some are curved; and a flexible door panel in the form of a unitary plastic sheet which is pivotable between an open configuration and a closed configuration, the door panel being resiliently deformable from a substantially flat configuration to a curved configuration corresponding to the curvature of the curved edge portions of the door frame such that in the closed configuration the door panel is adapted to adopt the curved configuration and in the open configuration, the door panel is freely straightenable to the substantially flat configuration.

[0013] Preferably the curved edge portions of the door frame are such that the door panel curves convex outwardly. Most preferably, the door is uniformly curved about an upright axis. The curved edge portions of the door frame may comprise the top and bottom edges of the door frame.

[0014] In a most preferred form of the invention, the door structure is embodied in a storage structure having pocket type doors. Suitably, such a storage structure includes a plurality of walls to provide a framework having a front and an interior. The door panel is suitably pivotable relative to the framework between a closed position in which the door panel at least partially covers the front and an open position, and slidable between the open position and a pocketed position in which the door panel is at least partially received within the interior of the framework. Most preferably, in the pocketed position, the door panel is configured in a straighter configuration compared to the curved configuration adopted for the closed position. This provides economy of space

WORKMAN, NYDEGGER & SEELEY
A PROFESSIONAL CORPORATION
ATTORNEYS AT LAW
1000 EAGLE GATE TOWER
60 EAST SOUTH TEMPLE
SALT LAKE CITY, UTAH 84111

in the pocketed position. The auxiliary panel is preferably slidably mounted within the interior. The door panel and the auxiliary panel may comprise a one piece flexible plastic construction with a live hinge dividing the door panel from the auxiliary panel.

[0015] The auxiliary panel may be received within a cavity open at the front of the framework, the cavity being defined by two side walls. Most preferably, the edge of one of the side walls defines a hinging edge of the door frame about which the door panel hinges. Furthermore, the door frame preferably includes a side edge along which the outer edge of the flexible door panel may be secured to maintain the curved configuration. Any of the features described above in accordance with the first aspect of the invention may be applied to the second aspect of the invention.

[0016] This invention may also be said broadly to consist in the parts, elements and features referred to or indicated in the specification of the application, individually or collectively, and any or all combinations of any two or more of said parts, elements or features, and where specific integers are mentioned herein which have known equivalents in the art to which this invention relates, such known equivalents are deemed to be incorporated herein as if individually set forth.

[0017] The invention consists in the foregoing and also envisages constructions of which the following gives examples.

WORKMAN, NYDEGGER & SEELEY
A PROFESSIONAL CORPORATION
ATTORNEYS AT LAW
1000 EAGLE GATE TOWER
60 EAST SOUTH TEMPLE
SALT LAKE CITY, UTAH 84111

BRIEF DESCRIPTION OF THE DRAWINGS

[0018] In order that the invention may be more fully understood one embodiment will now be described by way of example with reference to the drawings in which:

[0019] Figure 1 is a perspective view of a storage unit in accordance with a preferred embodiment of the present invention, as shown from the front;

[0020] Figure 2 is a perspective view of the storage unit of Figure 1, except shown from behind;

[0021] Figure 3 is a perspective view of a portion of the storage unit illustrated in Figure 1, shown with the door panel in the pocketing position;

[0022] Figure 4 is a perspective view of the portion shown in Figure 3, except with the door panel illustrated as closing;

[0023] Figure 5 is a diagrammatic sketch of a top view of the portion illustrated in Figure 3 illustrating the door in the pocketed position;

[0024] Figure 6 is a diagrammatic front view of the portion of the storage unit shown in Figure 5;

[0025] Figure 7 is a diagrammatic side view of the portion of the storage unit shown in Figure 5;

[0026] Figure 8 is a diagrammatic top view of the storage unit illustrating the door in the open position and in the closed position;

[0027] Figure 9 is a schematic front view of the portion of the storage unit shown in Figure 8 in the closed configuration;

[0028] Figure 10 is a schematic side view of the portion of the storage unit illustrated in Figure 8 in the open configuration;

[0029] Figure 11 is a perspective view of a storage unit in accordance with a second preferred embodiment of the present invention as shown from the front;

[0030] Figure 12 is a sectional view of the storage unit illustrated in Figure 11 from above, the door panels being in the open configuration;

[0031] Figure 13 is an enlarged detail of B of Figure 12;

[0032] Figure 14 is an enlarged detail of C of Figure 12;

[0033] Figure 15 is a plan view of the storage unit of Figure 11 with the top removed and with the doors shown in the closed position;

[0034] Figure 16 is an enlarged detail of C of Figure 15;

[0035] Figure 17 is an enlarged detail of D of Figure 15;

[0036] Figure 18 is a sectional view through a door panel when in the pocketed configuration as shown in Figure 12;

[0037] Figure 19 is a detail of A of Figure 11; and

[0038] Figure 20 is an enlarged detail of a latch to retain the door panel in the closed configuration.

WORKMAN, NYDEGGER & SEELEY
A PROFESSIONAL CORPORATION
ATTORNEYS AT LAW
1000 EAGLE GATE TOWER
60 EAST SOUTH TEMPLE
SALT LAKE CITY, UTAH 84111

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0039] The storage unit 10 illustrated in Figures 1 and 2 includes a top work surface 12, a base 14 which is mounted on castors or wheels 16. As the storage unit 10 is intended to be mobile, the top 12 includes integrally formed handle portions 18 enabling a user to selectively move the storage unit as required. The storage unit 10 may also facilitate attachment of a number of accessories and apertures 20 are specifically provided for this purpose. Furthermore slots 22 provided in the side walls 24 of the storage unit 10 facilitate the attachment of shelves to the sides of the storage unit.

[0040] From an appreciation of Figures 1 and 2 it can be seen that in plan, the outline of the storage unit 10 is elliptical. Accordingly, the top work surface 12 has an elliptical outline as with the base 14. Extending between the top work surface and the base 14 are two side walls 24 and a back wall 26 which generally define a framework for a storage space inside the storage unit 10. The framework defines an interior 30 (See Figure 3) and a front 32 which in Figure 1 is closed by a pair of door panels 35. It will be seen from Figure 1 that the door panels 35 when in the closed configuration as illustrated, adopt a curved configuration, corresponding to the curvature of the corresponding edge of the top work surface 12 and the base 14. The door panels 35 hinge about live hinges 37 disposed centrally of the front of the framework.

[0041] Referring to Figure 3, only a portion of the storage unit 10 is illustrated, sufficient to show the operation of a single door panel 35. For clarity, the rear wall 26 and one of the side walls 24 is also removed. Figure 3 illustrates the door panel 35 in a pocketed configuration whereby it is received within the interior 30 of the storage structure 10. The door panel 35 is part of a unitary plastic sheet which also incorporates an auxiliary panel 40. Between the auxiliary panel 40 and the door panel 35, a region of

reduced thickness is provided which defines the live hinge 37. The plastic sheet forming the door panel 35 and the auxiliary panel 40 is resiliently deformable to enable the door panel 35 to adopt the curved configuration as illustrated in Figure 1. An appropriate maternal is polypropylene.

[0042] As can be seen from Figure 7, the auxiliary panel 40 has upper and lower tabs 42 which are slidingly received within respective upper and lower guide slots 44. The lower guide slot 44 can be seen from an inspection of Figure 4. With the tabs 42 slidingly received in respective guide slots 44, the auxiliary panel 40 is able to slide from a pocketed position A in which the door panel 45 is wholly received within the interior 30 of the storage structure to an open position as depicted by B as shown in Figure 8. Once the door panel reaches the open position, the tabs 42 of the auxiliary panel reach the end of their travel within guide slots 44, the guide slots 44 terminating a short distance before the front edge of the top work surface 12 and the base 14 as can be seen from Figure 18. At this point, the door panel 35 will not be permitted to slide further outwards. As such, as shown in Figure 8 once the door panel 35 reaches the position indicated by B, the position of the live hinge 37 will correspond approximately with the front of the storage unit.

[0043] The door panel 35 may then be pivoted about live hinge 37 until the door panel 35 reaches the closed position as depicted by C in Figure 8. It can be seen that the door panel 35 adopts a curvature corresponding to the curvature of the front edge of the top work surface 12 and the base 14. The door panel 35 may bear against upper and lower curved edge portions of the door frame, thereby defining the appropriate curvature for the door panel 35.

WORKMAN, NYDEGGER & SEELEY
A PROFESSIONAL CORPORATION
ATTORNEYS AT LAW
1000 EAGLE GATE TOWER
60 EAST SOUTH TEMPLE
SALT LAKE CITY, UTAH 84111

[0044] Figures 11 to 20 illustrate a second preferred embodiment of the present invention which to all intents and purposes is very similar to the first embodiment illustrated in Figures 1 to 10, except that the second embodiment includes provision of a retainer in the form of a latch. The drawings of this embodiment also provide further detail of various parts of the storage unit 10' and like numerals represent like parts.

[0045] Referring to Figure 12, greater detail of the framework of the storage unit 10' can be seen. As already explained, the framework comprises side walls 24, rear wall 26, base 14 and top 12 which has been removed from view in Figure 12. Additionally, the side walls 24 and the rear wall 26 are shrouded with steel covers 45, 46. The side covers 45 are each held between an extruded side wall end cap 48 which can be seen more clearly in Figure 20 and a corner extrusion 49 as shown in Figure 12. The back cover is 46 held in position between the corner extrusions 49. It can be seen that the back cover 46 conforms in curvature to the curvature of the adjacent edge of the base 14.

[0046] Figure 12 also illustrates the two mid walls 50 between which is provided a pocket into which the integral door panels 35 and wall panels 40 can be received in the pocketed configuration. Detail B (Figure 13) illustrates the forward end of the mid walls 50 which have extruded side wall edge caps 52. Additionally, the outer end of the door panels 35 also have extruded door panel edge caps 54 which can also be seen in greater detail in Figure 20.

[0047] Figure 14 illustrates detail C in greater detail. The inner ends of the auxiliary panels 40 have extruded strengthening caps 56.

[0048] As can be seen from Figure 12, the outer walls 24 and the mid walls 50 have vertically aligned shelf plugs 58. Such vertically aligned shelf plugs 58 are provided at

various levels within the interior of the storage unit 10' to provide support for a series of shelves (not shown).

[0049] While Figures 12 to 14 illustrate the door panels 35 and auxiliary panels 40 in the pocketed configuration, Figures 15 to 17 illustrate the door panels 35 and auxiliary panels 40 in the closed configuration. Each door panel 35 is retained in the closed configuration by means of a latch 60 which is shown in greater detail in Figure 17 as well as Figure 20.

[0050] Referring to Figure 20, it can be seen that each latch 60 comprises a latch body 62 adjacent to the outer side of the side cover 45. The inner end of the latch body 62 is affixed to the side wall 24 by a latch fixing boss 64. The outer end of the latch body 62 comprises a latch head 66 defining a projection which extends toward the door panel 35. The latch body 62 is flexible. In the closed configuration as shown, the projection of the latch head 66 cooperates with the door panel edge cap 54 to retain the door panel 35 in the closed configuration. The latch 60 also comprises a lock 68 which operates a locking cam 70. When in the unlocked state, the outer end of the latch 60 is permitted to flex away from the side wall 24 and the corresponding side wall edge cap 48 to enable the door panel edge cap 54 to be released from its nested configuration within a channel of the side wall edge cap 48. In the locked configuration of the lock 68, the lock cam 70 cooperates within a channel of the side wall end cap 48 to prevent the outer end of the latch body 62 from moving outwardly, thereby retaining the door panel edge cap 54 within its nested configuration and hence the door panel 35 in the closed configuration.

[0051] The foregoing describes only one embodiment of the present invention and modifications may be made thereto without departing from the scope of the invention.